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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/518,452	12/20/2004	Takahiro Furutani	0020-5330PUS1	7850
2292 7590 03/15/2007 BIRCH STEWART KOLASCH & BIRCH PO BOX 747 FALLS CHURCH, VA 22040-0747			EXAMINER SHOSHO, CALLIE E	
			ART UNIT	PAPER NUMBER
			1714	
SHORTENED STATUTORY PERIOD OF RESPONSE		NOTIFICATION DATE	DELIVERY MODE	
3 MONTHS		03/15/2007	ELECTRONIC	

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Notice of this Office communication was sent electronically on the above-indicated "Notification Date" and has a shortened statutory period for reply of 3 MONTHS from 03/15/2007.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

mailroom@bskb.com

Office Action Summary

Application No.

10/518,452

Applicant(s)

FURUTANI ET AL.

Examiner

Callie E. Shosho

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 December 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5 and 8-12 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5 and 8-12 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>See Continuation Sheet</u> . | 6) <input type="checkbox"/> Other: _____ |

Continuation of Attachment(s) 3). Information Disclosure Statement(s) (PTO/SB/08), Paper No(s)/Mail Date :12/20/04,
11/23/05, 12/21/05 & 3/31/06.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claim 10 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 10 recites organic solvent that is “monoalkyl ether monoalkyl ester derivative of (poly)alkylene glycol or “dialkyl ester derivative of (poly)alkylene glycol”. The scope of the claims is confusing given that it is not clear what is meant by “derivative” or what types of organic solvents are encompassed by the cited phrases.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1-2 and 8-11 are rejected under 35 U.S.C. 102(e) as being anticipated by Doshi (U.S. 2005/0272833) taken in view of the evidence given in Patil et al. (U.S. 5,907,333) and *Hawley's Condensed Chemical Dictionary*.

Attention is drawn to paragraphs 333-336 of Doshi that discloses ink comprising 20% cyan dispersion comprising 20.77% pigment, 7% white dispersion comprising 38.8% pigment, 9% Elvacite 2008 (30%) in EB acetate, i.e. ethylene glycol butyl ether acetate, 9% Epon 2004 (30%) in ethylene glycol butyl ether acetate, and 47.2% ethylene glycol butyl ether acetate. It is calculated that the ink comprises approximately 59.8% $(47.2 + (0.7) * 9 + (0.7) * 9)$ ethylene glycol butyl ether acetate, 6.7% $(0.2077 * 20 + 0.388 * 7)$ pigment and 2.7% Elvacite 2008 $(0.3 * 9)$. It is well known, as evidenced by Patil et al. (col.8, lines 53-59), that Elvacite 2008 is polymethyl methacrylate comprising 2-3% carboxylic acid, i.e. water-insoluble acrylic resin having a hydrophobic group, i.e. methyl methacrylate, and an acid group, i.e. carboxylic acid group. Further, it is well known, as evidenced by *Hawley's Condensed Chemical Dictionary* (page 469), that ethylene glycol monobutyl ether acetate has boiling point of 192.3 °C.

In light of the above, it is clear that Doshi anticipates the present claims.

5. Claims 1-2 and 8-11 are rejected under 35 U.S.C. 102(b) as being anticipated by Ichikawa (U.S. 5,980,624) taken in view of the evidence given in *Hawley's Condensed Chemical Dictionary*.

Ichikawa discloses oil-based ink comprising 20-95% ester solvent such as ethylene glycol ethyl ether acetate, 5-33% pigment, and 1-20% styrene-acrylic acid copolymer, i.e. water-insoluble acrylic resin having a hydrophobic group, i.e. styrene, and acidic group, i.e. acrylic

acid (col.1, lines 5-8, col.2, line 66-col.3, line 1, col.3, lines 17-28 and 47-51, col.4, lines 65-66, col.5, lines 16-17, 29, and 40-51, and col.6, line 42). It is well known, as evidenced by *Hawley's Condensed Chemical Dictionary* (page 470) that discloses that ethylene glycol ethyl ether acetate has boiling point of 156.3 °C.

In light of the above, it is clear that Ichikawa anticipates the present claims.

6. Claims 1-2, 5, and 8-9 are rejected under 35 U.S.C. 102(e) as being anticipated by Kiguchi et al. (U.S. 6,627,364).

Kiguchi et al. disclose ink jet ink comprising 100 parts pigment, 10-1000 parts binder, and 100-10,000 parts organic solvent possessing boiling point greater than 245 °C. The binder is carboxyl group-containing copolymer obtained from (meth)acrylic acid and co-monomer such as styrene or alkyl (meth)acrylate, i.e. water-insoluble acrylic resin having hydrophobic group, i.e. styrene or alkyl (meth)acrylate, and acidic group, i.e. (meth)acrylic acid. It is disclosed that the binder is also obtained from ether monomer such as methoxypropylene glycol (meth)acrylate. The binder possesses weight average molecular weight of 3,000-300,000. It is calculated that the ink comprises approximately 0.9-47.6% pigment, 0.099-83.3% binder, and 8.3-98.9% solvent (col.1, lines 9-15, col.3, lines 23-25, col.4, lines 23-36 and 62-63, col.5, lines 3-9, 20-25, and 57-60, col.6, lines 52-56, col.7, lines 1-4, col.8, lines 51-61, and col.9, lines 1-4, 20-27, 31-33, 39-41, and 49-53). Attention is drawn to example 2 that discloses ink comprising 100 parts pigment, 50 parts binder, and 1700 parts solvent with boiling temperature greater than 245 °C from which

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it is calculated that the ink comprises approximately 5.3% pigment, 2.7% binder, and 89.3% solvent.

In light of the above, it is clear that Kiguchi et al. anticipate the present claims.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

8. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later

invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

9. Claims 3-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ichikawa (U.S. 5,980,624) in view of Suzuki et al. (U.S. 6,245,832).

The disclosure with respect to Ichikawa in paragraph 5 above is incorporated here by reference.

The difference between Ichikawa and the present claimed invention is the requirement in the claims of acid value and molecular weight of the acrylic resin, i.e. styrene-acrylic acid copolymer.

Suzuki et al., which is drawn to ink jet ink, disclose the use of styrene-acrylic acid copolymer possessing acid value of 200-500, weight average molecular weight of 3,000-15,000, and molecular weight distribution, i.e. weight average molecular weight/number average molecular weight, of 1-2.5. It is disclosed that if the acid value is lower, there is deteriorated stability while if the acid value is higher, there is poor water resistance or low image density. It is further disclosed that if the molecular weight distribution exceeds 2.5, the viscosity increases or the dispersion is unstable (col.4, lines 13-14 and 35-42).

In light of the motivation for using styrene-acrylic acid copolymer with specific molecular weight and acid value disclosed by Suzuki et al. as described above, it therefore would have been obvious to one of ordinary skill in the art to use styrene-acrylic acid copolymer with such acid value and molecular weight in Ichikawa in order to produce stable ink with suitable

viscosity, good water resistance, and good image density, and thereby arrive at the claimed invention.

10. Claims 3-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kiguchi et al. (U.S. 6,627,364) in view of Suzuki et al. (U.S. 6,245,832).

The disclosure with respect to Kiguchi et al. in paragraph 6 above is incorporated here by reference.

The difference between Kiguchi et al. and the present claimed invention is the requirement in the claims of acid value and molecular weight of the acrylic resin.

Suzuki et al., which is drawn to ink jet ink, disclose the use of styrene-acrylic acid copolymer possessing acid value of 200-500 and molecular weight distribution, i.e. weight average molecular weight/number average molecular weight, of 1-2.5. It is disclosed that if the acid value is lower, there is deteriorated stability while if the acid value is higher, there is poor water resistance or low image density. It is further disclosed that if the molecular weight distribution exceeds 2.5, the viscosity increases or the dispersion is unstable (col.4, lines 13-14 and 35-42).

In light of the motivation for using acrylic resin with specific molecular weight and acid value disclosed by Suzuki et al. as described above, it therefore would have been obvious to one of ordinary skill in the art to use acrylic resin with such acid value and molecular weight in Kiguchi et al. in order to produce stable ink with suitable viscosity, good water resistance, and good image density, and thereby arrive at the claimed invention.

11. Claims 1-3 and 8-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over WO 02/556619 in view of Zhu et al. (U.S. 6,251,175) and Ohta et al. (U.S. 5,954,866).

WO 02/55619¹ discloses ink jet ink comprising 50-99% organic solvent that is mixture of diethylene compound and dipropylene compound each having boiling point of 150 °C or higher, 0.5-25% pigment possessing average particle size of 50-500 nm, and binder that is acrylic resin. The diethylene compound includes diethylene glycol monoethyl ether acetate. It is disclosed that the ink possesses viscosity of 10 mPas and surface tension of 20-50 mN/m (col.1, lines 7-9, col.2, lines 20-27, col.3, lines 1-4 and 64-65, col.4, lines 32-37 and 48-55, col.4, line 65-col.5, lines 2, col.5, lines 10-14, and col.8, lines 9-13 and 36-39).

The difference between WO 02/55619 and the present claimed invention is the requirement in the claims of specific acrylic resin.

Zhu et al., which is drawn to ink jet ink, disclose the use of binder that it acrylic resin obtained from styrene and co-monomers including acrylic acid, i.e. water-insoluble resin having hydrophobic group, i.e. styrene, and acidic group, i.e. acrylic acid, in order to provide good adhesion of images to substrate and to provide rapid drying time. The acrylic resin includes that known under the tradename Joncryl 682 which possesses acid value of 238 (col.4, lines 10-11, col.5, line 58-col.6, line 6, and col.7, lines 4-6). It is well known, as disclosed by Ohta et al. (col.13, lines 48-49), that Joncryl 682 is a styrene/acrylic acid copolymer.

¹ It is noted that when utilizing WO 02/55619, the disclosures of the reference are based on Oyanagi et al. (U.S. 7,156,909) which is an English language equivalent of the reference. Therefore, the column and line numbers cited with respect to WO 02/55619 are found in Oyanagi et al.

In light of the motivation for using specific acrylic resin disclosed by Zhu et al. as described above, it therefore would have been obvious to one of ordinary skill in the art to use such acrylic resin in WO 02/55619 in order to produce ink with rapid drying time that produces images with good adhesion to substrate, and thereby arrive at the claimed invention.

12. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over WO 02/556619 in view of Zhu et al. and Ohta et al. as applied to claims 1-3 and 8-12 above, and further in view of Suzuki et al. (U.S. 6,245,832).

The difference between WO 02/556619 in view of Zhu et al. and Ohta et al. and the present claimed invention is the requirement in the claims of molecular weight of the acrylic resin.

Suzuki et al., which is drawn to ink jet ink, disclose the use of styrene-acrylic acid copolymer possessing weight average molecular weight of 3,000-15,000 and molecular weight distribution, i.e. weight average molecular weight/number average molecular weight, of 1-2.5. It is disclosed that if the molecular weight distribution exceeds 2.5, the viscosity increases or the dispersion is unstable (col.4, lines 13-14 and 35-42).

In light of the motivation for using acrylic resin with specific molecular weight disclosed by Suzuki et al. as described above, it therefore would have been obvious to one of ordinary skill in the art to use acrylic resin with such molecular weight in WO 02/556619 in order to produce stable ink with suitable viscosity, and thereby arrive at the claimed invention.

13. Claims 1-3, 8-9, and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 07-109431 in view of Zhu et al. (U.S. 6,251,175) and Ohta et al. (U.S. 5,954,866).

Pending formal translation and using a machine translation of the reference, it is noted that JP 07-109431 discloses ink jet ink comprising 55% or more non-aqueous solvent having boiling point of 150 °C or higher including glycol ether such as tri-, di-, ethylene glycol alkyl ether or tri-, di-, propylene glycol alkyl ether, 1-20% pigment having dispersion average particle size of 0.1-2 µm, and 0.1-10% acrylic resin. The ink possesses viscosity of 2.2-20 cP and surface tension of 20-60 dyne/cm (abstract and paragraphs 13, 15, 16, 19, 23, 28, and 42).

The difference between JP 07-109431 and the present claimed invention is the requirement in the claims of specific acrylic resin.

While JP 07-109431 discloses the use of acrylic resin, there is no disclosure of specific acrylic resin as presently claimed, i.e. water-insoluble acrylic resin having an acidic group and an hydrophobic group.

Zhu et al., which is drawn to ink jet ink, disclose the use of binder that it acrylic resin obtained from styrene and co-monomers including acrylic acid, i.e. water-insoluble resin having hydrophobic group, i.e. styrene, and acidic group, i.e. acrylic acid, in order to provide good adhesion of images to substrate and to provide rapid drying time. The acrylic resin includes that known under the tradename Joncryl 682 which possesses acid value of 238 (col.4, lines 10-11, col.5, line 58-col.6, line 6, and col.7, lines 4-6). It is well known, as disclosed by Ohta et al. (col.13, lines 48-49), that Joncryl 682 is a styrene/acrylic acid copolymer.

In light of the motivation for using specific acrylic resin disclosed by Zhu et al. as described above, it therefore would have been obvious to one of ordinary skill in the art to use such acrylic resin in JP 07-109431 in order to produce ink with rapid drying time that produces images with good adhesion to substrate, and thereby arrive at the claimed invention.

14. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over JP 07-109431 in view of Zhu et al. and Ohta et al. as applied to claims 1-3, 8-9, and 12 above, and further in view of Suzuki et al. (U.S. 6,245,832).

The difference between JP 07-109431 in view of Zhu et al. and Ohta et al. and the present claimed invention is the requirement in the claims of molecular weight of the acrylic resin.

Suzuki et al., which is drawn to ink jet ink, disclose the use of styrene-acrylic acid copolymer possessing weight average molecular weight of 3,000-15,000 and molecular weight distribution, i.e. weight average molecular weight/number average molecular weight, of 1-2.5. It is disclosed that if the molecular weight distribution exceeds 2.5, the viscosity increases or the dispersion is unstable (col.4, lines 13-14 and 35-42).

In light of the motivation for using acrylic resin with specific molecular weight disclosed by Suzuki et al. as described above, it therefore would have been obvious to one of ordinary skill in the art to use acrylic resin with such molecular weight in JP 07-109431 in order to produce stable ink with suitable viscosity, and thereby arrive at the claimed invention.

15. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Matzinger (U.S. 2001/0000253) disclose ink jet ink comprising hydrocarbon/acrylic hybrid resin, pigment, and organic solvent including glycol ethers, however, there is no disclosure that the solvent has boiling point of at least 150 °C as presently claimed.

JP 2001-192595 discloses oily ink comprising solvent with boiling point greater than 150 °C, pigment, and acrylic resin, however, there is no disclosure of specific acrylic resin as presently claimed, i.e. water-insoluble acrylic resin having an acidic group and an hydrophobic group.

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Callie E. Shosho whose telephone number is 571-272-1123. The examiner can normally be reached on Monday-Friday (6:30-4:00) Alternate Fridays Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vasu Jagannathan can be reached on 571-272-1119. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Callie E. Shosho
Primary Examiner
Art Unit 1714

CS
3/9/07